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Controlling pocket gopher damage to agricultural crops

W.D. Edge

Pocket gophers cause considerable damage to hay and grain crops as well as to cherry, apple, pear, and filbert orchards. Some of the losses are a direct result of feeding activities of gophers: Root-clipping apple and cherry trees, eating alfalfa hay and filbert nuts. Other losses result from tunneling and mound-building activities: Soil and rocks from mounds damage harvesting machinery and degrade quality of crops. This publication describes activities designed to reduce damages by pocket gophers to hay, grain, and orchard crops.

Pocket gophers are also a serious problem to homeowners and gardeners: Controls for gophers under these circumstances are outlined in EC 1115. Damages to hay, grain, and orchards usually occur over larger acreages, calling for control methods that differ from those used by the homeowner and gardener.

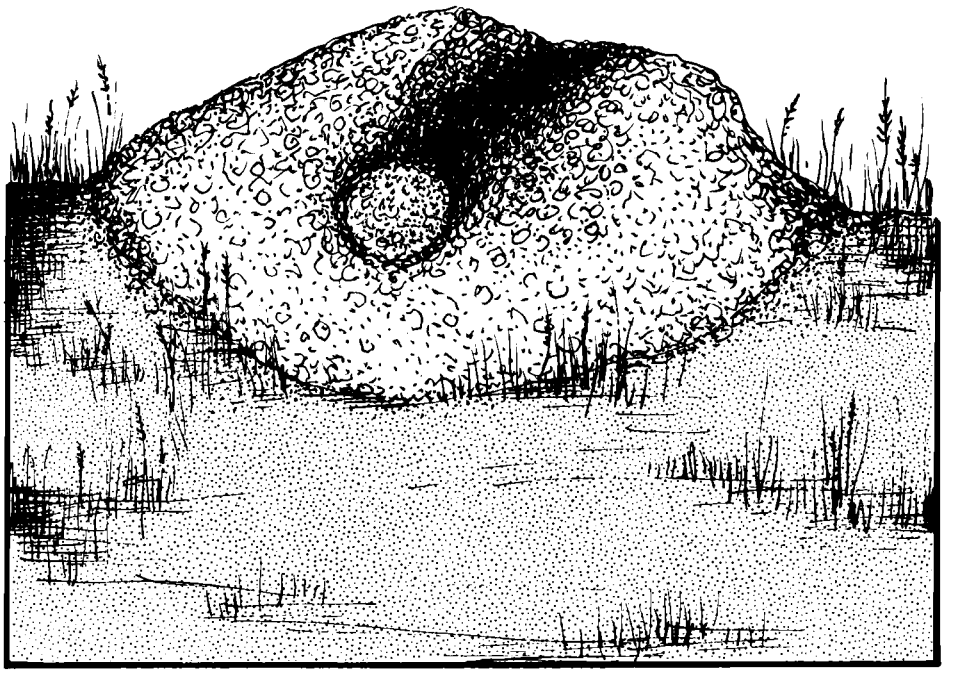

Figure 1.—Pocket gopher mound

Identify the pest

As with any control program, your first step is to ensure that you have properly indentified the pest. Damages by other pests such as moles and mice may closely approximate those of gophers, but control methods for these pests are different and don't work for the pocket gopher.

Because the mole is also a burrower and mound builder, it's easy to make a mistake in identification.

Pocket gophers extend lateral (side) tunnels to the surface from their deeper main tunnels and push out the excess soil in flattened or fan-shaped mounds. These vary from 12 to 24 inches in diameter and 4 or more inches in height. The gophers then plug the surface opening through which this soil is pushed, leaving a noticeable dent or plug at one end of the pile (figure 1). The entire lateral may be backfilled to the main tunnel.

Moles. Mole mounds are the result of repeated eruptions from below and simply continue to grow or enlarge until the mole has disposed of the excess soil and moved on. Mole mounds are higher and generally rounder in shape than gopher mounds and look more like miniature volcanoes.

No hole at the side of the mound is evident. However, if you place your finger in the middle of the mound and push it down in a circular fashion, you'll discover the mole's hole is in the

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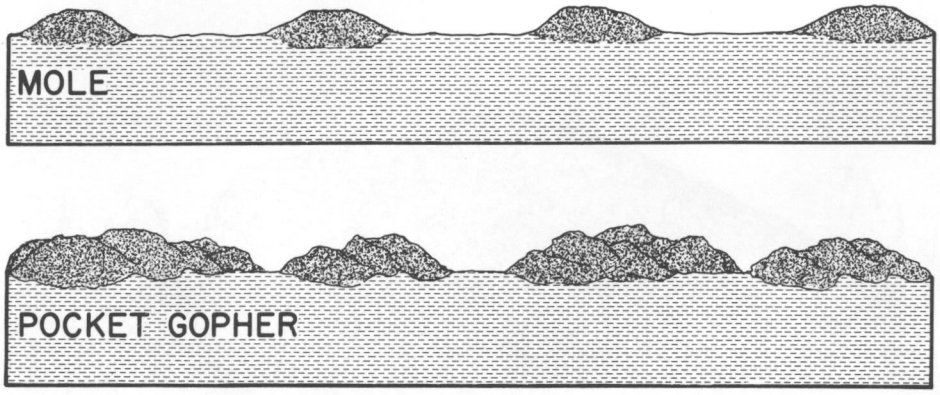

Figure 2.—Mound patterns, mole and pocket gopher

middle rather than on the edge of the mound.

The pattern of mounds helps to distinguish gopher from mole activity. Gopher mounds tend to be clumped in tight groups; the mole's tend to be spaced in a line as single mounds (figure 2).

Meadow mice (voles). Another pest commonly misidentified with the pocket gopher is the meadow mouse or vole. These small animals girdle the base of cherry and apple trees, often killing the trees.

A good clue is the presence of small tunnel systems at or just below the surface of the ground in the shelter of grass or weedy cover. Meadow mice have no mounds at the entrance of their open burrows, which are about the size of a 50¢ piece. The tooth marks of voles are very small and leave a fuzzy appearance on the bark of damaged trees.

Pocket gophers will girdle but more often tend to clip off roots and rootlets. When the root system of damaged trees is exposed, the loss of roots and rootlets is very typical (figure 3).

Voles will use pocket gopher burrow systems but may make their own excavations as well. Any area with pocket gopher burrows and mounds that also has small open holes with interconnecting surface tunnels can be suspected of harboring both voles and pocket gophers.

Tree squirrels have been known to strip bark from the base of filbert and other orchard trees. This type of damage is totally different from that caused by pocket gophers or voles, so there should be little confusion. Also, there are no burrow openings or mounds; tree squirrels make their homes in hollow openings in trees as well as in large, bulky leaf nests. Almost always there is an adjacent hardwood woodlot from which squirrels forage.

Other species, such as porcupines, cottontail, and jackrabbits, will also girdle fruit, nut, and ornamental trees. However, their damage is usually quite extensive around the base of trees. Pocket gopher damage will be much lower on the tree.

Legal status

Pocket gophers are classified as nongame wildlife under the Oregon Wildlife Codes, and they're not afforded any specific protection. Furthermore, the wildlife codes permit a landowner or agent to control noxious animals on his or her property. Pocket gophers in Oregon are not protected under Federal regulations.

Figure 3.—Root damage by pocket gophers

Control methods

Flood irrigation. Years ago, farmers flooded hay and grain crops requiring irrigation with a thin sheet of water in spring and at intervals throughout early summer. This forced pocket gophers to leave their burrow systems or drown—and resulted in nearly 100% control. Invasion from adjacent nonirrigated lands or reinvasion by animals forced to nearby higher ground is often a problem.

The advent of sprinkler irrigation increased acreages where irrigated crops could be grown, such as on hillsides and uneven lands, but pocket gophers aren't flooded out under sprinkler irrigation, so this form of cheap control isn't generally available.

In situations where you can use flood irrigation and pocket gophers are a serious problem, consider this method but give careful attention to control in surrounding areas, to prevent reinvasion.

Vegetation management. Studies have indicated that pocket gopher damages can be reduced by about 50% by applying herbicides that remove vegetation pocket gophers require for food. This option is limited to orchards and to noncrop areas close to hay and grain crops.

Other studies have indicated that removing existing crops (such as alfalfa), followed by deep tilling, will disrupt burrow systems, remove food, and result in a significant reduction in pocket gopher numbers in fields so treated.

When alfalfa fields begin to decline in productivity for one reason or another, plow them up and plant some alternate crop rather than keep them in alfalfa for a few additional years at greatly reduced yields.

Trapping. Techniques for trapping pocket gophers are outlined in EC 1115. In situations where infestations are limited to 5 or fewer acres, trapping might be an option. You could also trap as a followup to larger-scale poisoning operations, to remove pocket gophers that escaped or avoided the poison baiting.

Trapping is not recommended as the primary control method on large acreages because of labor requirements and the high potential for pocket gopher reinvasion.

Poison baiting. Because of constantly changing labels, laws, and regulations, Oregon State University can assume no liability for the consequences of use of chemicals suggested here. In all cases, read and follow the directions and precautionary statements on the specific pesticide product label.

The application of toxicants to control pocket gopher damage is generally recommended when larger agricultural areas (10+ acres) are heavily infested. A variety of toxicants are available in the form of poison baits, such as oats and wheat seeds, alfalfa pellets, seed mixtures, and dried fruits.

Toxicants currently registered by the U.S. Environmental Protection Agency and the Oregon Department of Agriculture include strychnine, zinc phosphide, and acute anticoagulants such as chlorophacinone.

Most commercially available baits have a seed base, but the pelletized alfalfa and grain-raisin-apple mixtures have been highly effective under some circumstances.

Pocket gophers are active year-round, but the best times for baiting coincide with the best soil conditions for applying baits. Gopher burrowing activity seems to increase in late winter and early spring when the soil softens, and this is a good time to begin baiting, just before the pocket gophers reproduce and have young. Eliminating one female pocket gopher at this time will prevent several little pocket gophers from developing into problems later.

During summer, the soil generally hardens as it dries. There is less burrowing activity, and baits are more difficult to apply. With the rains in early fall, the soil begins to soften again, and burrowing activity of pocket gophers increases. Then you can once more apply baits effectively, now against adults plus the young that were produced earlier in the breeding season.

Apply baits only to fresh burrow systems. You can identify these by leveling mounds with a hard iron rake or by foot and then returning in a day or two to determine where fresh activity is occurring. Revisit areas 2 to 3 days after baiting to search for fresh mounds, which indicate where pocket gophers avoided control. Such areas require additional baiting or trapping.

Because pocket gophers will rapidly reinvade areas that have been cleared by poison baiting, survey such areas periodically so that you can control any invading pocket gophers quickly.

Applying poison baits underground to pocket gophers results in low hazard to nontarget wildlife. Studies have shown that some mice and voles may be accidentally poisoned in the burrow systems, but relatively few other nontarget animals contact the baits directly.

Poisoned pocket gophers almost always die belowground, so their carcasses are rarely available on the surface to nontarget scavengers such as hawks and owls. Avoid bait spillage, but if

Use pesticides safely!

- **Wear** protective clothing and safety devices as recommended on the label. **Bathe or shower** after each use.
- **Read** the pesticide label—even if you've used the pesticide before. **Follow closely** the instructions on the label (and any other directions you have).
- **Be cautious** when you apply pesticides. **Know** your legal responsibility as a pesticide applicator. You may be liable for injury or damage.

it occurs, bury baits promptly to avoid hazard to nontarget birds and mammals.

Hand-baiting. Hand-baiting is described in EC 1115 and is recommended only where infestations are localized on small (2 to 5 acres) areas. Hand-baiting is slow, requiring 7 to 20 hours to treat 1 acre.

Probe-bait dispensers. Probe-bait dispensers (figure 4) allow you to probe for runways and dispense the poison bait in one step. Their use is about twice as fast as hand-baiting. The probe-bait dispensers generally can operate only with grain baits. (Pelleted baits and baits containing raisins and dried fruits usually won't pass through the dispensing mechanism.)

Push the probe-bait dispensers into the ground in a circular pattern around fresh mounds as you seek the runways. Once you find a runway (the dispenser suddenly sinks 2 to 4 inches deeper in the ground), a twist of a lever dispenses a measured amount of bait into the runway. Place three to five baits in runways around each cluster of fresh gopher mounds.

Burrow builder. For situations where pocket gopher infestations are severe on 10 or more acres, the burrow builder (figure 5) is the most effective way to dispense baits.

The burrow builder is designed for use with a tractor of at least 25 horsepower and having a conventional three-point hitch. The device consists of a supporting frame, a depth-adjustable, burrow-forming torpedo at the end of a shank, a rolling coulter to cut surface trash and shallow roots ahead of the shank, a bait-metering device, and press wheels to drive the metering unit and close the knifelike slit made by the upper portion of the shank. The bait is dropped into the artificial burrow through a tube built into the shank.

The torpedo is pulled 6 to 10 inches below ground level, forming an artificial burrow. Baits are dispensed every 18 to 48 inches. Pocket gophers use the artificial burrows, where they intercept their own burrow system. When they discover and eat the machine-placed baits, they're poisoned.

Pull the burrow builder at a speed of 2½ to 3½ miles per hour. You can treat an acre in 6 to 12 minutes, a marked improvement over baiting by hand or with the probe-bait dispenser.

For maximum effectiveness, the artificial burrow must be at the same approximate depth as natural gopher burrows. You can determine this by digging into a burrow system, measuring the depth, and adjusting the depth of the torpedo.

The torpedo must be level under ground. If it is angled downward, it will be hard for the tractor to pull. If the torpedo is angled upward, it will not stay below ground. Build these artificial burrows 20 to 25 feet apart.

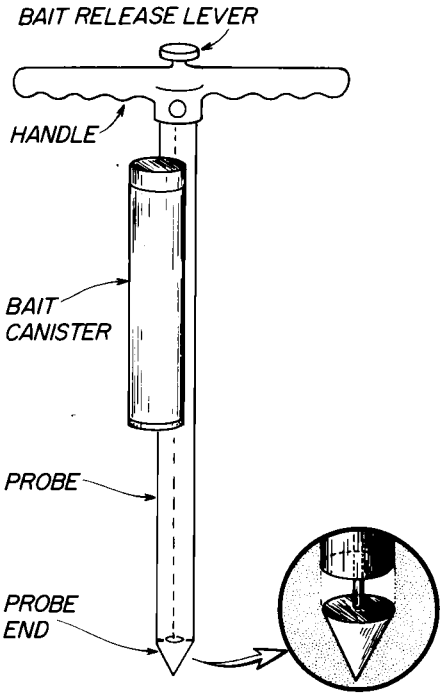

Figure 4.—Probe-bait dispenser

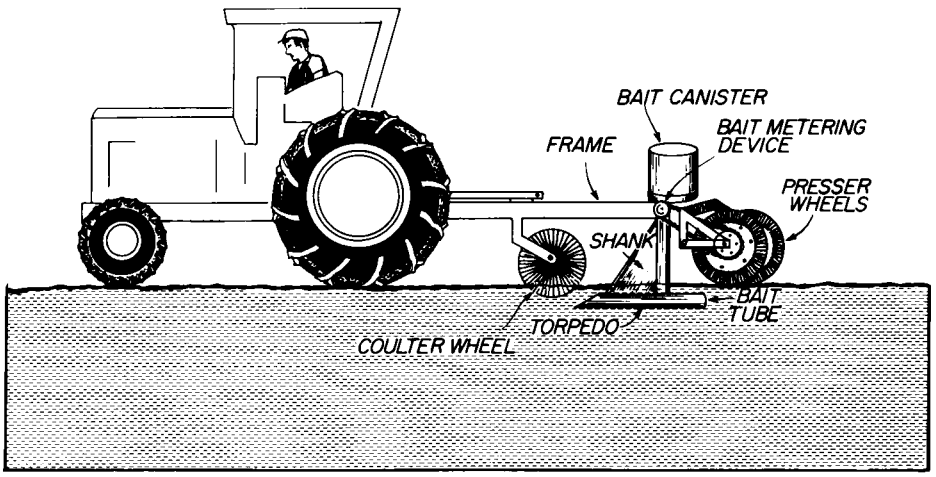

Figure 5.—Burrow builder

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